

*United States Court of Appeals
for the Second Circuit*



APPELLEE'S BRIEF

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ORIGINAL

IN THE
United States Court of Appeals
For the Second Circuit

MOBIL OIL CORPORATION,
Plaintiff-Appellee,

v.

W. R. GRACE & COMPANY,
Defendant-Appellant.

On Appeal from the United States District Court
for the District of Connecticut

PLAINTIFF-APPELLEE'S BRIEF



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TABLE OF ABBREVIATIONS

The following abbreviations are used in this brief:

- PX — Plaintiff's trial exhibit No. —.
- DX — Defendant's trial exhibit No. —.
- Tr. — Transcript of the proceedings below.
- Op. — Opinion of Judge Clarie reported at 367 F. Supp. 207.
- Br. — Defendant-Appellant's Brief.
- “249-10/3-4” Refers to the 249 patent, column 10, lines 3 to 4.

Emphasis is ours throughout except as otherwise stated.

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PLAINTIFF-APPELLEE'S BRIEF

I. STATEMENT OF THE CASE

**A. The Nature of the Case, the Course of
Proceedings and the Disposition
in the Court Below**

This is a patent infringement action brought by plaintiff Mobil Oil Corporation ("Mobil") against defendant W. R. Grace & Co. ("Grace") charging infringement of three of Mobil's United States Patents, Nos. 3,140,249 ("249"), 3,140,253 ("253") and 3,436,357 ("357") relating to gas oil cracking catalysts.

Trial of this action commenced November 16, 1971 before the Honorable T. Emmet Clarie and lasted 16 trial days, concluding on December 17, 1971. The record below includes 3,266 pages of trial transcript and approximately 300 exhibits comprising thousands of pages. The Trial Court heard the testimony of 20 live witnesses. The parties submitted post-trial briefs totalling 360 printed pages. On November 2, 1973 Judge Clarie entered his Memorandum of Decision which comprises 129 pages and is reported at 367 F. Supp. 207.

Judge Clarie found the patented inventions to be "revolutionary" (Op. 234); a "break-through * * * the greatest single catalytic advance in 27 years" (Op. 222); and "a most significant scientific achievement in catalytic action in the petroleum refining field" (Op. 216). He further found that their adoption by the industry resulted in savings of some two billion dollars (Op. 235).

In holding those patents infringed, the Trial Court found:

"Defendant Grace had no reasonable non-infringement defense. Defendant's own writings and extra-judicial assertions persuade the Court that defendant knew its product infringed plaintiff's patent rights. Defendant, from the moment it learned of plaintiff's invention began a concerted and successful course to imitate, duplicate, and market the fruits of plaintiff's labors and expense * * *." (Op. 253).

In dismissing Grace's misuse defense Judge Clarie found that "Grace was not negotiating in good faith" for a license under the patents in suit (Op. 246); that Mobil "continued to offer to license Grace under any patent or patents the latter desired" (Op. 249); and that there "is no evidence to substantiate the allegation that Mobil in any way attempted to coerce Grace to take a license under more of Mobil's patents than Grace desired, or that Mobil 'conditioned' any grant upon acceptance of a license under unwanted patents" (Op. 249).

The painstaking consideration given to the matters before him is reflected by Judge Clarie's citation of transcript and exhibit references for virtually every statement

of fact in his Memorandum of Decision. His findings are fully supported by the evidence and his reasoning and legal conclusions are in accord with the established principles of this Court and the Supreme Court. Accordingly, the Trial Court's Judgment holding Claims 1, 15 and 19 of the 249 patent, Claims 19, 23, 24, 28 and 32 of the 253 patent and Claims 7, 9, 10, 17, 19 and 20 of the 357 patent valid, enforceable and infringed should be affirmed.

B. The California Actions

In *Mobil Oil Corp. v. Filtrol Corp. and Texaco Inc.*, Civil Action No. 69-633-F (C.D. Calif.), Judge Ferguson held Claim 17 of the 357 patent, i.e., one of the 14 claims which are the subject of this appeal, to be valid, albeit non-infringed, and dismissed defendants' antitrust counter-claim and misuse defense predicated on the Mobil/Grace licensing negotiations (Op. 223, 246). The Ninth Circuit Court of Appeals on July 22, 1974, affirmed on the non-infringement and antitrust-misuse issues, but vacated the holding of validity in keeping with its rule that a holding of non-infringement renders the validity issue moot.

The 249 and 253 patents here in suit were not at issue in Civil Action No. 69-633-F, but were asserted in *Mobil Oil Corp. v. Filtrol Corp. and Texaco Inc.*, Civil Action No. 64-1572-RJK (C.D. Calif.). On September 13, 1974 Judge Kelleher ruled in that action that the 249 and 253 patents were infringed by Filtrol Corp. and Texaco Inc.

C. Statement of Facts

1. The Problem of How to Increase Gasoline Yield Defied Solution

The patents in suit relate to cracking catalysts which convert gas oil, a fraction of crude oil as it comes from the ground, into the high octane gasoline which powers our modern industrial society (Op. 211). In the United States alone, in 1960, 1.2 billion barrels of gas oil were cracked to produce \$2.5 billion worth of gasoline (Op. 216). During the entire period 1940-1962 the only gas oil crack-

ing catalyst used by the industry was silica-alumina (Op. 217). That catalyst possessed a fatal flaw. It was capable of producing only a limited amount of gasoline per barrel of gas oil cracked and produced "excessive amounts of waste by-products, in the form of dry gas and coke" (Op. 217).

There was an "enormous" incentive to develop a better catalyst (Op. 218). A catalyst which could produce even 1% more gasoline was worth \$80,000 *per day* or more than \$20,000,000 per year to the industry (Op. 218). Given that incentive, the industry engaged in a "fierce competitive research-race" to develop an improved catalyst (Op. 218). As found by Judge Clarie, however, the art "made no significant improvement in petroleum catalytic cracking during 20 years of well-organized, active, and expensive research effort in this sensitive catalytic field of chemical magic and unpredictable results" (Op. 218).

2. Plank and Rosinski Solved the Problem

Plank and Rosinski solved the problem by creating the "revolutionary new catalysts" of the patents in suit which produce 20% more gasoline than the best prior art catalyst (Op. 234; PX 618). At the time Plank and Rosinski made their inventions "no researcher dreamed that a new catalyst might be created, which would industrially increase gasoline yield more than 20% from the same volume of gas oil and reduce the amount of coke byproduct by 60%" (Op. 234).

3. Plank and Rosinski Revolutionized the Art

Mobil promptly tested and commercialized the Plank and Rosinski inventions (Op. 224). When Mobil announced its revolutionary new catalyst to the world in 1962, "the industry was amazed and taken by surprise" (Op. 234). As publicly admitted by Grace:

"For approximately 25 years cracking catalysts used in the petroleum industry remained essentially unchanged. * * *

"During the early 1960's, however, a breakthrough of major proportions took place in cracking catalyst development when a brand new class of crystalline type cracking catalysts was introduced to the United States petroleum industry. These were conventional silica-alumina catalysts in combination with crystalline molecular sieves." (PX 738, Tab 4).

* * *

"Although it has been a quarter of a century since the original commercialization of the fluid catalytic cracking process, no single catalyst advance in all this time can match that of the past two years, the development of the zeolitic fluid cracking catalyst.

"By incorporating specific forms of crystalline alumino-silicates known as molecular sieves into specially designed amorphous alumina-silica matrices, new catalysts have been developed with exceptional cracking activity and coke and gasoline selectivity. * * *" (PX 738, Tab 8).

* * *

"The greatest single catalyst advance in the 27 years which have passed since the commercialization of the fluid cracking process is the development of the molecular sieve promoted catalyst. The incorporation of specific forms of these crystalline alumino-silicates into specially designed amorphous alumina-silica matrices has resulted in new catalysts having exceptional cracking activities and excellent coke and gasoline selectivities.

"The impact of this new class of catalysts on the United States' gasoline-oriented refining industry was both immediate and great. * * *" (PX 738, Tab 5).

* * *

"Swift approval of radically new catalysts has not been a hallmark of the petroleum refining industry. But times have changed! In an unprecedented move refiners the country over have enthusiastically accepted

molecular sieve containing fluid cracking catalysts since their introduction in early 1964. * * *'' (PX 738, Tab 1).

* * *

“‘By 1969 approximately 85% of all refineries had converted to some kind of crystalline, molecular sieve-type catalyst.’ (PX-738, tab 5, 116622).” (Op. 224).

In sharp contrast to its present position that this revolution was attributable to Fleck of Union Oil, Rabo of Union Carbide and Kimberlin of Esso, Grace *ante litem motam* admitted:

“The events which brought about this rapid change began in May 1962, when Socony Mobil [now plaintiff Mobil] announced a new bead cracking catalyst * * *” (PX 494, Document 107109).

4. The Making of the Patented Inventions

(a) *The Invention of the 249 Patent*

In 1956 Mobil, like everyone else in the industry, was using the old silica-alumina catalyst to commercially crack gas oil to produce gasoline (Op. 218). Dr. Charles J. Plank and Edward J. Rosinski at that time were research chemists in the employ of Mobil working on catalytic research at its Paulsboro, New Jersey laboratory (Op. 218). Dr. Plank was head of the catalyst research group (Tr. 2659-61), while Rosinski was working in the catalyst development group where he had been employed since 1947 (Tr. 314-15).

In February 1956, as a result of extensive research, Rosinski postulated that it might improve catalytic activity and selectivity if uniform pores could be generated within the amorphous silica-alumina catalyst, which has pores which are random in size and distribution (Op. 218).

“* * * The theory was that the non-uniform and uniform pores of his resulting composite catalyst might interact and work in concert to produce a new and enhanced cracking effect * * *.” (Op. 218).

Rosinski's initial efforts to implement this concept were unsuccessful. For example, he formed uniform pores in the amorphous silica-alumina catalyst by incorporating organic substances therein and later burning them out. Although the resulting catalyst gave an initial indication of more selective performance, this advantage was lost upon steaming of the catalyst (Tr. 366-68, 789-94; PX 652; Op. 218). As a result, Rosinski's "initial attempts to convince his superiors of the merits of his theory met with no success" (Op. 218-19).

In mid-1956, however, Rosinski discussed his ideas with Dr. Plank, who had tried a similar idea, without success, in connection with some of his own earlier research (Op. 219). Plank was so impressed with Rosinski's ideas that he secured Rosinski's transfer to his own group (Op. 219). The union of these two creative minds resulted in the invention of the 249 patent on January 25, 1957 (Op. 227 n15, 228, 229).

In making the invention of the 249 patent, Plank and Rosinski went contrary to basic teachings in the art at that time. For example: (i) they successfully composited a crystalline (zeolite) material with an amorphous silica-alumina catalyst matrix, despite the long held view that the presence of a crystalline material would adversely affect the catalytic performance of silica-alumina (Op. 220, 228); and (ii) they successfully base exchanged with ammonium, despite the experience that such exchange would destroy zeolite (Op. 220, 226-27).

The 249 patent contains a detailed disclosure of the Plank and Rosinski invention, including the extraordinary operating achievements.

"* * * the catalyst described herein is over *twice as active* as conventional silica-alumina cracking catalyst. In addition, the present catalysts have a *very high degree of steam stability*. Of even more importance is the fact that their *selectivity* in gas oil cracking is *extraordinary* * * *." (9/75-10/4).

Such performance characteristics are actually achieved by the 27 operating examples in the 249 patent, and illustrated graphically by the drawing of the patent. Example 3 is typical. Following steaming to simulate commercial conditions, it produced about 21% more gasoline, 24% less dry gas and 39% less coke than the best prior art catalyst (PX 618; Op. 221).

(b) The Invention of the 253 Patent

Plank and Rosinski continued their experimental work and in June-July 1960 prepared catalyst CP 4473 by successfully compositing crystalline zeolite X with amorphous silica-alumina and base exchanging with both rare earth and ammonium (Tr. 563-67; PX 85). When CP 4473 was tested it was found to be the most active and most selective catalyst yet made (Op. 222). Most surprising was the fact that after 60 hours of steaming,* it remained more active than catalyst CP 4340, which had not been base exchanged with ammonium and which, up to that time, had been the most stable (Tr. 574-76; PX 717A). This discovery, which is the subject of the 253 patent, further contradicted the teaching in the art that base exchange with ammonium would destroy the zeolite (Tr. 442-45, 2668-71; Op. 220, 226-27). Base exchange with ammonium did not destroy Plank and Rosinski's new catalysts. To the contrary, it caused them to become more, not less, stable.

The importance of base exchanging with both rare earth and a hydrogen precursor, e.g., ammonium, is emphasized in the 253 patent specification as follows:

“While not wishing to be bound by any theory of operation, it nevertheless appears that the rare earth cations tend to impart stability to the aluminosilicate compositions, thereby rendering them far more useful for catalytic purposes, particularly in hydrocarbon conversion processes such as cracking. For reasons not completely understood, rare earth cations are extremely superior in this regard to all other metallic cations, especially when associated with hydrogen ions or hydrogen ion precursors. * * *” (11/45-54).

* Steaming for 60 hours is equivalent to use for a year in a commercial cracking unit (Op. 220).

The unexpected advantages achieved by following the teachings of the 253 patent are exemplified by the numerous operating examples given in the patent, including table after table of actual cracking data taken under commercial test conditions. Typical is Example 50. Following steaming, it produced about 19% more gasoline, 58% less coke and 28% less dry gas than amorphous silica-alumina, the best prior art commercial catalyst (PX 618). These are truly remarkable and extraordinary operating advantages in an art that considered a 1% increase in gasoline yield to be highly significant (Op. 218).

(c) *The Invention of the 357 Patent*

Plank and Rosinski did their early zeolite composite catalyst work using high alumina zeolite, i.e., X-type zeolite which contained about 33% alumina (Op. 220; PX 547, Table A). The conventional knowledge was that catalysts having a high alumina content were better than similar catalysts having a low alumina content (Tr. 2734; PX 620).

In making the invention of the 357 patent, however, Plank and Rosinski went contrary to the conventional wisdom. They successfully composited crystalline zeolite Y with amorphous silica-alumina and discovered that the new composite was more active than composite catalysts they had produced using zeolite X, despite the fact that zeolite Y has a *lower* alumina content (25%) than zeolite X (33%) (Tr. 942-45, 542-49; PX 259, PX 266, PX 268; DX-FD Document No. 10914). As found by the Trial Court:

"* * * Grace's own witness conceded that the Y zeolite in a matrix is much more effective than X zeolite in a matrix * * *." (Op. 239).

This admission by Grace is in full accord with the teaching of the 357 patent that a "synergistic" interaction occurs between the zeolite and the matrix (2/44-50).

Seventeen working examples with cracking data under commercial test conditions are provided in the 357 patent to teach persons skilled in the art how to obtain the benefits of the invention. Particularly impressive is the enhanced

reduction in coke (e.g., 65%) achieved with these Y-type composite catalysts together, of course, with the increased gasoline yield of 20% (PX 618).

5. The Synergisms and Unexpected Performance Achievements of the Patented Catalysts

Plank and Rosinski successfully composited crystalline zeolite with amorphous silica-alumina so as to create gas oil cracking catalysts which possess operating advantages and performance achievements which are unexpected and greater than could be predicted by summing the results achieved by using the components separately. With the composite catalysts of Plank and Rosinski, in other words, $2 + 2 = 5$ or more. The evidence is (Tr. 344-50, 578-601, 1443-49; PX 243, PX 245, PX 615, PX 616, PX 693A) and the Trial Court found this phenomenon, known as synergism, to be present in the patented catalysts to a remarkable degree and in a variety of forms:

“All three of these patented catalysts produced synergistic results. [*] The rare earth and rare earth hydrogen forms of the composite catalyst actually improved in activity and selectivity after being exposed to the heat and steam encountered in the oil cracking operations, whereas all prior catalysts decreased their activity and selectivity under similar conditions (Tr. 363-364; 503-508; 517-525). By incorporating the zeolite component into the silica-alumina matrix, the interaction of one with the other produced much greater catalytic activity of the zeolite component than when used separately. The composite catalyst achieved unexpected results (PX 738) both in its activity and yield and exceeded the performance of each when used separately. Furthermore, the octane rating of the gasoline produced was unexpectedly higher (Tr. 578-579).”
(Qp. 223-24)

* “[A] synergistic result is strong if not conclusive evidence of non-obviousness.” *Van Gorp Mfg., Inc. v. Townley Industrial Plastics, Inc.*, 464 F. 2d 16, 20 (5th Cir. 1972).

6. Grace's Assertions Are Refuted by the Opinion and Record Below

In its brief Grace makes assertions which are contrary to Judge Clarie's Opinion and the record in this case including, *inter alia*:

(a) Grace alleges that Judge Clarie did not consider the "collective teachings" of the prior art on the question of invention (Br. 26-27). Grace is wrong. Judge Clarie in his opinion expressly found that the numerous differences between the claimed inventions and the prior art taken "in combination" were not obvious (Op. 236).

(b) Grace asserts (Br. 28-30) that the Trial Court "ignored * * * completely" the belated, unpublished, abandoned ideas of Schwartz (DX-AAT), Esso (DX-AAK) and Union Carbide (DX-W). Grace is wrong. Judge Clarie expressly referred to such evidence at page 255 of his opinion and found these incidents not to constitute prior art against any of the patents in suit.

(c) Grace asserts that "the results produced by Plank and Rosinski's catalysts were not unexpected" (Br. 30n). This assertion is flatly contradicted by Judge Clarie's findings, e.g., that at the time Plank and Rosinski made their inventions "no researcher dreamed that a new catalyst might be created, which would industrially increase gasoline yield more than 20%" (Op. 234), and Grace's own extra-judicial admission that "* * * 'the advent of Zeolite Catalysts brought benefits and profits * * * that few of us could have imagined before 1960.' (PX-738, tab. 3)." (Op. 224).

(d) Grace attacks the Trial Court's findings that X and Y-type zeolites were "known to the art" in 1953 as "unsupported by any evidence" (Br. 32). Grace is wrong. Those findings are fully supported by Grace's *own evidence*. For example, Grace offered below and the Trial Court received DX-AG. It is Union Carbide's Milton patent filed in 1953 and therefore prior art as of that date. 35 U.S.C. §102(e). It discloses zeolite X for use as an adsorbent (Op.

241). Grace also offered and the Court received DX-AI, Union Carbide's Milton and Breck patent, which has an effective filing date and is therefore prior art as of 1953. It discloses faujasite, a large pore zeolite having a silica-alumina ratio of more than three, i.e., a Y-type zeolite (Op. 242).

(e) Grace asserts that Kimberlin taught that rare earth exchanged zeolites were "superior" to silica-alumina as cracking catalysts (Br. 13, 15-16, 19). This assertion is predicated on a misconstruction of Judge Clarie's Opinion, i.e., Grace seeks to convert the Trial Court's acknowledgement that Grace made such a contention below (Op. 243), into a finding of fact. The Kimberlin patent on its face precludes such an interpretation of Judge Clarie's Opinion. Kimberlin expressly discloses and Judge Clarie expressly found that Kimberlin's *best* catalyst produced 10% less gasoline than silica-alumina and 20% more coke.

"* * * *Kimberlin's catalyst E, containing magnesium catalyst X, which had the highest catalytic activity and selectivity* (column 6, lines 28-34), *did in fact produce a 10% lesser yield in gasoline* (44.5% D & L) *than did the regular silica-alumina when used on the same feedstock, so as to yield 50% D & L. It also produced 20% more coke* (an unwanted byproduct) *than did the standar-dized silica-alumina by the same test. Thus Kimberlin's disclosure, indicating its gasoline yield results to be comparatively inferior to silica-alumina, did not encourage workers in the art to press forward with the use of zeolite for gas oil cracking until after Mobil's revolutionary public announcement in 1962.*" (Op. 229)

(f) Grace asserts (Br. 7, 20n, 35) that in making their 249 invention Plank and Rosinski employed the "identical" procedure of and followed "in virtually all respects" the Schwartz patent (DX-AE). Grace is wrong. The evidence is and Judge Clarie found that Schwartz relates *solely* to the "amorphous silica-alumina catalysts which have since been rendered obsolete" by the patented inventions (Op. 227). Schwartz nowhere suggests the use of zeolites (Op.

228) or reports any composition having catalytic activity or selectivity greater than that of the old silica-alumina catalyst. Moreover, Plank and Rosinski actually tried the Schwartz catalyst preparation procedure and found it to be "detrimental" (Tr. 1463-64).

(g) Grace asserts (Br. 36-37) that Plank and Rosinski learned from Hart and Bourguet that rare earth exchanged zeolites had "superior cracking properties". Grace is wrong again. Hart and Bourguet were engineers in the process development section at Mobil's Paulsboro Laboratory (Tr. 1476-77). Hart's experience with catalyst preparation was limited (Tr. 1481). After discussing Plank and Rosinski's work with Rosinski in February 1959 and again in March 1960 (PX 363A, PX 363B; Tr. 1477, 1481-83) and after receiving Rosinski's suggestion concerning the use of trivalent (rare earth is trivalent) cations for base exchanging zeolites (Tr. 1482-83) and after reviewing Plank's work (PX 772; Tr. 2697), Hart base exchanged X zeolite with rare earth (DX-CB). The resulting pure zeolite material produced no more gasoline but far more dry gas and coke than amorphous silica-alumina (DX-CB; Tr. 1483-86). Thus, Hart and Bourguet's catalyst was grossly *inferior* to silica-alumina and not "superior" as asserted by Grace (Br. 37).

(h) Grace asserts that Plank and Rosinski's base exchange of their zeolite with ammonium was a "clearly indicated, natural step" (Br. 36). Once again, Grace is wrong. The record establishes and Judge Clarie found that the prior art taught that base exchange of zeolites with ammonium rendered them "unstable and quite useless" for catalytic cracking (PX 102; Tr. 227-32; Op. 227).

(i) Grace asserts (Br. 36-37) that Plank and Rosinski somehow learned how to base exchange with ammonium from Rabo's abandoned December 1959 patent application (DX-AM-2). Grace is wrong. As the Trial Court found, Plank and Rosinski "actually reduced to practice" ammonium exchange of their composite zeolite catalysts in 1957, more than two years prior to Rabo's filing date (Op. 220).

(j) Grace asserts that the Trial Court placed undue emphasis on "commercial success" (Br. 30-31). Grace is wrong. Commercial success was but one of a multitude of factors considered by Judge Clarie in reaching his holdings of non-obviousness. Indeed, the Trial Court expressly found that "commercial success is not a substitute for invention" (Op. 256).

(k) Grace contends (Br. 5, 36, 37) that Plank and Rosinski, in making their inventions, did nothing more than dilute base exchanged zeolite with a matrix. The evidence is (PX 243, PX 615, PX 693A; Tr. 579-83, 1443-49) and Judge Clarie found that in the Plank and Rosinski patented catalysts the zeolite is not diluted by the matrix but, to the contrary, is rendered much more catalytically active.

"* * * By incorporating the zeolite component into the silica-alumina matrix, the interaction of one with the other produced much greater catalytic activity of the zeolite component than when used separately * * *." (Op. 224)

(l) Grace asserts that the Kimberlin patent (DX-AJ) invalidates the 249 patent (Br. 18-21). Grace is wrong. Since the application for the Kimberlin patent was not filed until February 5, 1957 (Op. 228), whereas the invention of the 249 patent was made by January 25, 1957 (Op. 227 n15, 228, 229) Kimberlin (DX-AJ) is *not prior art* against 249.*

(m) Grace's brief, inadvertently or otherwise, confuses the Kimberlin alleged prior art patent (DX-AJ) with the Kimberlin reissue patent (DX-WX) by failing to distinguish between the two (see, e.g., Br. 16, 31). Since the Kimberlin Reissue patent (DX-WX) was not applied for until after Mobil's announcement of its revolutionary new catalysts in 1962 (Op. 248), it is not prior art with respect to any of the patents in suit, a fact admitted by Grace (Br. 14n).

* "[O]bviousness is analyzed in terms of the prior art as of the time the invention was conceived." *Photon, Inc. v. Eltra Corp.*, 308 F. Supp. 133, 136 (N.D. Ill. 1969).

(n) Grace seeks to create the impression that Rabo's 990 abandoned application (DX-AM-2) teaches that zeolite Y is superior to silica-alumina as a gas oil cracking catalyst (Br. 17, 22, 24, 25, 26). Grace is wrong. Rabo DX-AM-2 contains absolutely *no* cracking data and does not even mention gas oil (Tr. 2218). Rabo exemplifies use of his catalysts only for the isomerization process where cracking is to be avoided (DX-AM-2, p. 19). Indeed, Professor Turkevich admitted that he published results of his own experiments which indicated that Rabo's zeolite would not crack (Tr. 2231; PX 760).

As found by the Trial Court, Rabo's U. S. Patent No. 3,323,762 (DX-AM-1) *does* disclose cracking data (Op. 244), whereas the abandoned Rabo application (DX-AM-2) *does not* (Op. 238-39). The difference in the disclosures of the Rabo patent (DX-AM-1) and the abandoned Rabo application (DX-AM-2) resulted from the filing by Rabo on February 7, 1962 of a new application which for the first time contained cracking data (Op. 238-39). As found by Judge Clarie, the effective filing date for the new material disclosed in the 762 patent "in respect to catalytic cracking, took legal effect only from February 7, 1962 and did not commence in December, 1959" (Op. 238-39). The cracking disclosure of the Rabo patent (DX-AM-1), therefore, is not prior art because its effective date, February 7, 1962, is significantly later than the invention dates of all three patents in suit (Op. 254).

II. THE PATENTS ARE VALID

A. The Trial Court Properly Resolved the Issue of Obviousness

The record in this case establishes that Judge Clarie reached his conclusions of non-obviousness by scrupulously following the dictates of the Supreme Court in *Graham v. John Deere*, 383 U.S. 1 (1966). Thus, Judge Clarie ascertained: (i) the scope and content of the prior art; (ii) the differences between the prior art and the claims at issue; and (iii) the level of ordinary skill in the art. After making

painstaking factual inquiries into each of these areas Judge Clarie concluded:

"The inventions disclosed and claimed in the '249, '253 and '357 patents differ structurally, functionally, and chemically from the prior art, taken alone or in combination. These differences are responsible for the unexpected performance, achievements, and synergistic qualities of the inventions in suit, compared to the materials of the prior art. Neither such differences nor the unexpected performance achievements or synergisms of the claimed inventions were rendered obvious by the prior art, taken alone or in combination. * * *" (Op. 236)

1. The Scope and Content of the Prior Art

In inquiring into patent validity, the Trial Court weighed the evidence with respect to the times when Plank and Rosinski made their inventions and found: (i) the invention of the 249 patent was made by January 25, 1957 (Op. 227 n15, 228, 229); (ii) the invention of the 253 patent was made by June 1960 (Op. 254); and (iii) the invention of the 357 patent was made by February 1960 (Op. 254).

The Court next determined which of the numerous references asserted by defendant constituted prior art against the patents in suit and held: (i) Kimberlin (DX-AJ) was not prior art against the 249 patent since Kimberlin's filing date of February 5, 1957 was subsequent to the January 25, 1957 invention date of the 249 patent (Op. 228);* (ii) Rabo's abandoned applications (DX-AL-2 and DX-AM-2) were not prior art against the 249 patent because their December 1959 filing dates were subsequent to the 249 invention date (Op. 228); (iii) the cracking data in Rabo's '761 and '762 patents (DX-AL-1 and DX-AM-1) was not prior art with respect to any of the patents in suit because its effective date of February 7, 1962 was significantly after the invention dates of each of the patents in suit

* Judge Clarie nevertheless went on to evaluate the merits of the Kimberlin patent (Op. 228-29).

(Op. 238-39, 254); (iv) Hart and Bourguet (DX-AK) was not prior art against any of the three patents in suit because its filing date of October 17, 1960 was after the invention date of each of the patents in suit (Op. 228); (v) the unpublished ideas of Schwartz (DX-AAT), Esso (DX-AAK) and Union Carbide (DX-W) were not prior art with respect to any of the patents in suit (Op. 255); and (vi) the unpublished writings of Messrs. Hart, Bourguet, Frabetti, Weisz and Frilette were not prior art with respect to any of the patents in suit (Op. 255).

The Trial Court then proceeded to make detailed findings concerning: (i) the history of petroleum refining between 1859 and 1939 (Op. 214-15); (ii) the history of the catalytic cracking of gas oil from its inception in 1939 until 1962, when the patented inventions were first commercialized (Op. 215-17); and (iii) the teachings of the art including: Thomas (DX-AA); Ahlberg (DX-AB); Pitzer (DX-AC); Schwartz (DX-AE); Cramer (DX-AF); Milton (DX-AG); Breck (DX-AH-1); Milton and Breck (DX-AI); Kimberlin (DX-AJ); Hart and Bourguet (DX-AK); Rabo (DX-AL-2 and DX-AM-2); Fleck (DX-AN); Richmond (PX-365), and Milliken, Mills and Oblas (PX-102). [Op. 226-31].

2. The Level of Ordinary Skill in the Art

The Trial Court considered the evidence and found that the level of ordinary skill in the art at the time the inventions were made was that possessed by a chemist working in the art of catalytic cracking (Op. 233).

3. The Differences Between the Prior Art and the Claimed Inventions

The Trial Court painstakingly compared the alleged prior art, taken alone and in combination, with the claimed inventions and found numerous differences in structure, function and result. These differences are set forth with particularity at pages 226-31 of the Opinion.

4. The Objective Criteria of Invention

The Supreme Court in *Graham v. Deere, supra*, expressly authorized the trier of fact to inquire into such factors as long felt but unfilled need, the failures of others to fill that need and commercial success in order "to give light to the circumstances surrounding the origin of the subject matter sought to be patented" (383 U.S. at 17-18).

Judge Clarie made such an inquiry and found: (i) there was a long felt but unfilled need for a catalyst capable of producing more gasoline and less dry gas and coke than silica-alumina (Op. 217-18); (ii) there was an "enormous" financial incentive to develop a catalyst superior to silica-alumina, i.e., a 1% increase in gasoline was worth \$80,000 a day (Op. 218); (iii) persons skilled in the art, including those employed by Grace and Houdry, tried and failed to produce a catalyst better than silica-alumina (Op. 218); (iv) the ingredients of the patented catalysts interact synergistically to produce completely unexpected results, e.g., they produce 20% more gasoline per barrel of crude oil (Op. 223-24, 234, 236); (v) the patented catalysts promptly displaced the best prior art catalyst which had been used exclusively for more than 20 years (Op. 217, 224, 236); (vi) use of the patented catalysts has saved the industry 2 billion dollars (Op. 235); (vii) the industry, including Grace, acclaimed the patented catalysts as nothing less than miraculous (Op. 222, 224, 234); (viii) Grace "copied the inventions of the patents in suit rather than the prior art" (Op. 256); and (ix) royalty bearing licenses have been granted under the patents in suit (Op. 224).

5. The Negative Teachings in the Art

In *United States v. Adams*, 383 U.S. 39, 52 (1966), the Supreme Court also sanctioned inquiry into teachings in the art which would have discouraged persons of ordinary skill from making the patented inventions. Here again, Judge Clarie made such an inquiry and found that the art taught: (i) that zeolites were heat sensitive and would "decompose" if exposed to the steam and temperature extremes encountered in catalytic cracking units (Op. 227);

(ii) that treatment of zeolites with ammonium rendered them "useless" (Op. 227); (iii) that zeolites as cracking catalysts were inferior to silica-alumina (Op. 228, 229); (iv) that the presence of a crystalline material (zeolites are crystalline) would "adversely affect" the cracking properties of silica-alumina catalysts (Op. 228); and (v) that the art of gas oil cracking is completely unpredictable (Op. 214, 218, 225-26, 256).

In addition to carefully evaluating the evidence and making detailed findings, the Trial Court considered the legal principles governing patentability as enunciated by the Supreme Court and by this Court (Op. 224-26, 235-36) and ruled that the inventions were not obvious. Moreover, he held that it was in the public interest to uphold the patentability of these inventions because "they encourage initiative, perseverance and substantial commercial investment in research for a more abundant life" (Op. 235).

This Court in *White v. Fafnir Bearing Co.*, 389 F.2d 750, 754, 752 (2nd Cir. 1968), has expressly sanctioned this type of analysis.

"Judge Clarie has analysed the scope and content of the prior art, the difference between the prior art and the claims in suit, and the level of ordinary skill in the pertinent art. He has also properly canvassed the secondary considerations of the commercial success of White's development, the long felt but unsolved needs of the industry, particularly the great pressure of the military for the meeting of the 'super-series' bearing requirements, and the failure of others, including Fafnir, to solve the problem in spite of intensive efforts and demands from their sales departments until they were able to copy White's development.

* * *

"* * * Essentially for the reasons set out in Judge Clarie's thorough opinion, we affirm the judgment."

B. The Trial Record Affirmatively Establishes the Non-Obviousness of the Patented Inventions

This Court is in the fortunate position of not having to speculate whether Plank and Rosinski's inventions would have been obvious to a person having *ordinary* skill in the art. The record establishes and the Trial Court found that they were not obvious to persons having *extraordinary* skill in the art (Op. 256). That this evidence comes largely from Grace's own documents and witnesses only serves to heighten its significance.

During the 1950's and early 1960's Grace was the world's major supplier of gas oil cracking catalysts (Op. 216-17, 234). Like everyone else in the industry, Grace was actively seeking to develop a catalyst superior to silica-alumina (Op. 217-18, 234). Indeed, during the period 1955-1962 Grace carried out extensive cracking catalyst research and filed 21 patent applications directed to improvements over silica-alumina, "but with no meaningful success" (Op. 218).

As part of its catalyst research effort Grace employed a staff of researchers "having *more* than ordinary skill in the gas oil cracking art" (Op. 234). Moreover, Grace immediately received copies of all patents relating to cracking catalysts issuing anywhere in the world (Op. 234). Thus, Grace's scientists were kept fully up to date on all art relating to cracking catalysts (Op. 234). In addition, Grace's very own business involved the manufacture and sale of: (i) large pore crystalline zeolites; (ii) rare earths; and (iii) amorphous silica-alumina cracking catalysts, the principal starting materials employed by Plank and Rosinski to create their "revolutionary" new cracking catalysts (Op. 234).

Further, Grace's skilled catalyst researchers had "actual knowledge" at least as early as 1955 that base exchanged forms of large pore crystalline zeolite X had some cracking activity (Op. 234). They also had "actual knowledge" by at least July 1960 that base exchanged large pore crystalline zeolite Y had some isomerization activity (Op. 234).

Notwithstanding all of the foregoing, Grace's Technical Director Blazek testified in open court that even as late as 1962 neither the composition nor the performance achievements of the patented catalysts were obvious to Grace's highly qualified catalyst scientists (Op. 234).

One simply cannot ask for more cogent proof of non-obviousness. As found by Judge Clarie (Op. 234), these historical facts "destroy" Grace's argument (Br. 32-33) that the making of the Plank and Rosinski inventions merely awaited the availability of large pore crystalline zeolites, which had been known since 1953 (Op. 228; DX-AG; DX-AI).

C. Grace's Obviousness Contentions Are Falsely Premised

Grace's entire obviousness position is grounded on the notion that the art of gas oil cracking catalysts is predictable. Thus, Grace argues that the patented inventions were: (i) "straightforward" (Br. 25); (ii) an "exercise of common sense logic" (Br. 25); (iii) "logical outgrowths of the prior art" (Br. 33); (iv) "obvious and routine" (Br. 22); (v) "a natural course to follow" (Br. 23); and (vi) a "routine modification" of the prior art (Br. 26). These assertions fly in the face of the Trial Court's findings, supported by overwhelming record evidence, that the gas oil cracking catalyst art is *completely unpredictable!*

The patented inventions relate to gas oil cracking catalysts, which involve "chemical magic and unpredictable results" and where "common chemistry book concept[s]" simply do not apply (Op. 211, 215, 218). The job of a gas oil cracking catalyst is to cause the large hydrocarbon molecules present in the gas oil to break up or "crack" in just the right way so as to produce smaller molecules having the precise size and shape needed for high octane gasoline (Tr. 163).

"* * * How the catalyst actually accomplishes this is not yet fully understood by the chemist nor fully ex-

plainable by science. Rather, it is the subject of much scientific postulation and theorization." (Op. 214).

* * *

"There is an inherent mystery surrounding the unpredictability of the performance of catalysts, a mystery which is generally recognized and acknowledged by chemists in the cracking art * * *." (Op. 235).

The record evidence fully supports these findings. For example, the technical literature reports that:

"* * * catalysts are notoriously susceptible to changes which may appear small and are often difficult to predict but which have a profound effect on production." (PX 755, Section 5, p. 1138).

The testimony of Mr. Kirkbride, a man of extensive industrial experience, was to the very same effect. When asked about the predictability of cracking catalysts he responded:

"Well, you just can't predict them. As a matter of fact, it's a very mysterious art and there's no rhyme or reason to it. It's just not predictable." (Tr. 3189).

The experience of Houdry and Grace in conducting catalyst research bears this out. Thus, Houdry considered some 3,000 catalysts as replacements for silica-alumina, none of which was ever commercialized (Op. 218). Grace filed 21 patent applications based on its efforts to improve upon the old silica-alumina catalyst "but with no meaningful success" (Op. 218).

The unpredictable nature of catalysts has long been judicially recognized as well.

"* * * catalytic action * * * cannot be forecast by its chemical composition, for such action is not understood and is not known except by actual test." *Corona Cord Tire Co. v. Dovan Chemical Corp.*, 276 U.S. 358, 368-69 (1928).

Judge Clarie's findings of unpredictability are fully supported by the trial record. They obliterate Grace's simplistic obviousness contentions which are based on the false notion that gas oil cracking catalysts are predictable.

D. Professor Turkevich Employed Hindsight in Reconstructing the Prior Art

Despite the completely unpredictable nature of the gas oil cracking catalyst art, Grace persists in its argument that the patented gas oil cracking catalysts involved no more than "an exercise of common sense logic" (Br. 25). This argument is based on the testimony of Professor Turkevich who conceded on cross-examination that he had never done any gas oil cracking in his life (Tr. 2159). The Trial Court found that Professor Turkevich "strained" in his interpretation of the prior art (Op. 230) and that he employed "hindsight" in reconstructing the prior art (Op. 244).

The record amply supports these findings. For example, on direct examination Professor Turkevich testified that the "prior art" taught that crystalline zeolites had a higher catalytic activity than amorphous catalysts (Tr. 2062). On cross-examination the only reference he could point to in support of that testimony was Kimberlin (Tr. 2118-19). Professor Turkevich was ultimately forced to concede, however, that Kimberlin's "best catalyst" was *inferior* to silica-alumina (Tr. 2126). This is precisely what Judge Clarie found (Op. 229).

Also, in connection with the Fleck patent:

"Professor Turkevich claimed that the symbols 10A and 10X were the same and were used interchangeably. However, when he was shown (PX-581) describing the Grace-Davidson molecular sieve 10A, as meaning the same as a 13X sodium zeolite, with the identical chemical content formula, he became more uncertain and indefinite. When pressed further on this point, he conceded that there was no statement in Fleck to indicate that 'a synthetic metallo-aluminosilicate having 10A pores' described in column 5, lines 12 to 13, was in fact a 10X type zeolite sieve (Tr. 2153-2154). * * *" (Op. 237).

Professor Turkevich's testimony is an object lesson in the danger of the hindsight approach to obviousness. Tes-

tifying at trial in 1971, Professor Turkevich opined that the inventions were obvious. Ten years earlier, however, when others were still struggling unsuccessfully to satisfy the critical need met by the Plank and Rosinski inventions, he refused to believe that they were feasible. Having heard rumors in 1961 of the Mobil zeolite catalysts, Professor Turkevich said "I'm doubtful that these are good catalysts" (Tr. 3136). Later, in the spring of 1962, when the M. W. Kellogg Co. tested Mobil's fluid zeolite catalyst, Professor Turkevich "refused to believe the results of the re-tests" (Op. 234). As Dr. Heinemann, then Kellogg's research director, explained:

"He [Turkevich] questioned our analytical procedures in obtaining these results because they were so far out of line—not the procedures, but the results were so far out of line with what one would normally expect." (Tr. 3138-39)

Dr. Heinemann, himself the inventor of 45 catalytic patents, admitted that upon first hearing of the Plank and Rosinski inventions he too was skeptical "because he had tested zeolites as catalysts and they did not perform well *for reasons which we understand today, but did not understand then*" (Op. 234). After seeing the results of the Kellogg tests on Mobil's new catalyst, however, "he concluded that 'this was the most revolutionary development that had occurred in a decade or two of gas oil cracking.' (Tr. 3137, 3138)" and informed Kellogg's Executive Committee that "this invention presented a major breakthrough in the industry (Tr. 3139)" [Op. 234]. This, too, evidences invention

"Nor are these the only factors bearing on the question of obviousness. We have seen that at the time Adams perfected his invention noted experts expressed disbelief in it. Several of the same experts subsequently recognized the significance of the Adams invention, some even patenting improvements on the same system." *United States v. Adams, supra*, 383 U.S. at 52.

Professor Turkevich, when subjected to questioning by the Court, further revealed his academic point of view:

"I am primarily concerned, your Honor, with identifying where this activity is. I am an academic man.

"And I view my function, my obligation, to try to understand the chemistry of the process, what tickles that molecule of hydrocarbon so that it breaks up in a desired way.

"I have not been concerned with commercializing these things. And so my point of view is slightly different than that of others who are present here." (Tr. 2224-25).

The Trial Court also heard the live testimony of Messrs. Kirkbride and Blazek, both of whom had extensive industrial experience (Tr. 121-45; 2246-50). Mr. Kirkbride testified and Judge Clarie found that the patented inventions would not have been obvious to a person having ordinary skill at the time they were made (Tr. 3200-11; Op. 236). Grace's own Technical Director Blazek testified in open court and Judge Clarie found that even as late as 1962 neither the composition nor the performance achievements of the patented catalysts was obvious to Grace's highly qualified catalyst scientists (Tr. 2374; Op. 234).

In holding that patentability could not be negated by the hindsight speculations of Professor Turkevich (Op. 244), Judge Clarie adhered to established legal principles.

"Knowledge after the event is always easy, and problems once solved present no difficulties, indeed, may be represented as never having had any, *and expert witnesses may be brought forward* to show that the new thing which seemed to have eluded the search of the world was always ready at hand and easy to be seen by a merely skillful attention. *But the law has other tests of the invention than subtle conjectures of what might have been seen and yet was not.*" *Diamond Rubber Co. v. Consolidated Rubber Tire Co.*, 220 U.S. 428, 436 (1911).

The question before the Trial Court was whether it would have been obvious to a person having ordinary skill

in the art, at the time the Plank and Rosinski inventions were made and viewing the prior art as a whole, to produce a catalyst capable of increasing gasoline yields by 20% (Op. 233). The question was *not* whether, more than ten years after the fact and with the patents in suit at hand, it might be possible for lawyers or academicians to carefully select portions of the alleged prior art to piece together the patented inventions in jig-saw puzzle fashion.

"While the defendant now argues, in retrospect and with the benefit of hindsight, that an analysis of the prior art indicates that the puzzle might have been put together, had the right parts only been placed in proper position, the problem was not one of putting together a specific chemical substance. Rather, the problem was to create a catalyst which was not only both stable and economically renewable, but which possessed special physical and chemical properties that would cause gas oil molecules to break down into substances which could be readily separated by known physical distillation processes." (Op. 235)

It is *this problem* which Plank and Rosinski solved. It is *this problem* which completely frustrated the prior art.

E. Plank and Rosinski's Own Work Is Not Prior Art

The law is settled that the unpublished, interim knowledge contributed by the inventors is not prior art. This and other Courts have so ruled and in no uncertain terms.

" * * In resolving the question of obviousness, the judicial view must not include the knowledge contributed by the patentee * * *."* *Shaw v. E. B. & A. C. Whiting Co.*, 417 F.2d 1097, 1105 (2d Cir. 1969), cert. denied, 397 U.S. 1076 (1970).

Accord: *Illinois Tool Works, Inc. v. Solo Cup Co., Inc.*, 461 F.2d 265, 269-70 (7th Cir.), cert. denied, 407 U.S. 916 (1972). This is precisely what Judge Clarie held.

"The unpublished interim thoughts, experiments, notebook records and writings of Plank and Rosinski

are not prior art against Plank and Rosinski United States Patents Nos. 3,140,249, 3,140,253 and 3,436,357" (Op. 255).

Nevertheless, Grace asks this Court to consider, on the question of obviousness, Plank and Rosinski's own, interim "experimental work" (Br. 33) and at Br. 5, 35, 36, 37 professes DX-DD, DX-DS, DX-EM, PX 77, PX 84 and PX 85 for that purpose. The bankruptcy of Grace's position on appeal is manifest, for none of those exhibits is prior art against any of the patents in suit. To illustrate:

(i) DX-DD is the unpublished invention memorandum Plank and Rosinski submitted to their patent attorneys and which was used to prepare the application for the 249 patent in suit (Tr. 882). The 249 patent specification incorporates almost verbatim the descriptive material and catalyst examples contained in that 17-page document.

(ii) DX-DS is another unpublished invention memorandum Plank and Rosinski prepared and submitted to their patent attorneys and which was used to prepare their own patent application S. N. 195,945 (DX-XX-1).

(iii) DX-EM is an unpublished, internal report of Plank and Rosinski's experimental work including, e.g., catalyst CP 4340, which is Example 26 of the 249 patent specification (Tr. 494).

(iv) PX 77 is another unpublished, internal report of Plank and Rosinski's experimental work including, e.g., catalyst CP 4253, which is Example 3 of the 249 patent specification (Op. 221).

(v) PX 84 is a collection of unpublished documents specifically relating to the preparation and testing of Plank and Rosinski catalyst CP 4340, i.e., Example 26 of the 249 patent (Tr. 495-96).

(vi) Finally, PX 85 is a collection of unpublished documents specifically dealing with the preparation and testing of Plank and Rosinski catalyst CP 4473, i.e.,

the very catalyst which constitutes the reduction to practice of the invention of the 253 patent in suit (Op. 222).

Illustrative of Grace's ploy is its use of Plank and Rosinski's unpublished invention memorandum DX-DS despite the express statutory prohibition that: "Patentability shall not be negated by the manner in which the invention was made" (35 U.S.C. §103).

"Zeolite Y was handled by Rosinski in the same way he had previously handled zeolite X. He base exchanged the Y material with the same ions which had previously been used with X zeolites, including rare earth ions and the combination of rare earth ions and ammonium ions (DX-DS, Table 1) * * *. " (Br. 37)

But Plank and Rosinski's unpublished work with zeolite X is not prior art with respect to their work with zeolite Y. Having made their basic invention in January 1957 (Op. 228) Plank and Rosinski were head and shoulders above the rest of the art. From that vantage point they could see things no one else even dreamed of (Op. 234). In effect, Grace's argument is that the 357 invention was personally obvious to Plank and Rosinski and therefore obvious to a person having ordinary skill in the art. That proposition is legally unsound.

"The test of obviousness under 35 U.S.C. §103 is an objective one. It is not a subjective test of 'invention'. In this regard it would also be *immaterial* whether or not the claimed subject matter was personally obvious to inventor Varga. Thomas Edison was justifiably granted many patents for inventions, at least some of which must have been personally obvious to him as a genius. It is likewise immaterial whether or not the claimed subject matter would have been personally obvious to any judge in 1957 [the invention date], unless the particular judge also happened to be 'a person having ordinary skill in the art to which said subject matter pertains.' " *Abington Textile Machine Works v. Carding Specialists Ltd.*, 249 F. Supp. 823, 829 (D.D.C. 1965).

In *Shaw v. Whiting, supra*, this Court reversed the lower court's conclusion that the patent was invalid because personally obvious to Shaw, the inventor.

"Furthermore, it appears that the court below may have used the benefit of hindsight when it stated that 'I find that Shaw expected an alignment in the direction of the axis by the tension forces mentioned in his patent. * * * In other words, Shaw did not obtain an unexpected result.' The issue, however, is not what the patentee expected to produce, but what a hypothetical person 'having ordinary skill in the art' would expect to develop if he had thought about the problem. 35 U.S.C. §103; *Graham v. John Deere Co., supra* * * *. (417 F.2d at 1105)

Grace's need to resort to the work of Plank and Rosinski is understandable, for only Plank and Rosinski taught the art how to prepare catalysts which would produce 20% more gasoline and much less dry gas and coke (Op. 234).

F. The Alleged Prior Art Is a Jungle of Confusion

Grace asserts that the patented inventions merely involved a "routine modification" of Fleck (DX-AN), Kimberlin (DX-AJ) and Rabo (DX-AM-2) [Br. 26]. To lend credence to this thesis, Grace has carefully cropped these three references so as to reveal only so much as appears to support its contentions while masking the fatal infirmities therein which teach directly away from and discouraged the making of the patented inventions. Judge Clarie, however, did not limit his inquiry to Grace's cropped renditions of Fleck, Kimberlin and Rabo (Op. 226-31). To the contrary, he considered *all* of the signposts in the art, i.e., he considered the passages which point away from the inventions as well as those asserted by Grace to point towards them, in keeping with the dictates of the Supreme Court that:

"* * * [K]nown disadvantages in old devices which would naturally discourage the search for new inventions may be taken into account in determining obvi-

ousness." *United States v. Adams, supra*, 383 U.S. at 52.

Fleck, Kimberlin and Rabo on their face preclude the hindsight combinations now proposed by Grace. To make such combinations one would have to ignore the numerous negative teachings in those references including, *inter alia*: (i) Fleck's teaching away that the zeolite be used as an adsorbent and not as a catalyst (Op. 230, 237); (ii) Fleck's teaching away that the zeolite should be used in the sodium form, which would be "destroyed" in a commercial gas oil cracking unit (Op. 229, 230, 237); (iii) Fleck's teaching away that his material could not be regenerated under commercial conditions (Op. 227); (iv) Fleck's teaching away that his catalyst was incapable of producing 1% more gasoline than silica-alumina (Op. 231); (v) Kimberlin's teaching away that the zeolite should be the sole catalyst in the reaction zone (Op. 228); (vi) Kimberlin's teaching away that zeolites were catalytically inferior to silica-alumina, producing at best 10% less gasoline and 20% more coke (Op. 228, 229); (vii) Kimberlin's teaching away that the presence of a crystalline material (zeolites are crystalline) would "adversely affect" the catalytic performance of silica-alumina (Op. 228); (viii) Kimberlin's teaching away that zeolites could not be regenerated at commercial temperatures (Op. 227); (ix) Rabo's teaching away that the zeolite be used alone (DX-AM-2); (x) Rabo's teaching away that the zeolite be impregnated with precious metals such as platinum and palladium (Op. 226) which would convert gas oil into the waste products dry gas and coke instead of gasoline (Tr. 1523-24, 3189-90); and (xi) Rabo's teaching away to use the zeolite in the isomerization process wherein cracking is to be avoided (DX-AM-2, p. 19).

In the language of *United States v. Adams, supra*, such negative teachings would have discouraged and deterred the hindsight combinations proposed by Grace.

"* * * These long accepted factors, when taken together, would, we believe, deter any investigation into such a combination as used by Adams. * * *" (383 U.S. at 52).

It is not without significance on the question of invention that: (i) Fleck was considered by the United States Patent Office before granting each of the patents in suit (249-26/67; 253-44/33; 357-22/63); (ii) Kimberlin was considered by the United States Patent Office before granting each of the patents in suit (249-26/68; 253-44/34; 357-22/64); and (iii) Rabo U. S. Patent No. 3,130,006 (PX 774), which is more relevant art than the abandoned Rabo application (Op. 239), was considered by the United States Patent Office before granting the 253 and 357 patents in suit (253-44/39; 357-22/59). Rabo's abandoned application is asserted only against the 253 and 357 patents.

It is also not without significance that the Fleck patent, which Grace asserts renders obvious all 14 claims on appeal, was found by Judge Clarie to be ambiguous, "obscure" and replete with "voids" and "uncertainties" (Op. 230). Fleck never even solved the problem he addressed, i.e., the nitrogen compound contamination of feedstocks (Tr. 3177). Fleck has never been commercialized and remains a paper patent to this day (Op. 229). In contrast, the patented catalysts have been extensively commercialized (Op. 224) and Plank and Rosinski were presented with the Award "for preparing the *first commercially useful zeolite catalyst*" (PX 653).

G. The Unpublished, Abandoned Ideas of Schwartz, Esso and Union Carbide Are Further Evidence of Non-Obviousness

At Br. 28-30 Grace discusses the belated, unpublished, abandoned ideas of Union Carbide (DX-W), Esso (DX-AAK) and Schwartz (DX-AAT). These incidents are three more examples of persons who tried but failed to solve the long standing problem in the art.

DX-W is an unpublished writing of Rabo of Union Carbide speculating on the possibility of converting clay to zeolite. The entry states that "no steaming" of the composition "is allowed" (p. 21). Since gas oil cracking catalysts must be capable of resisting the severe steaming

encountered in commercial gas oil cracking units (Op. 220) it is readily apparent that this idea was worthless.

While Grace labors to resurrect the *unpublished*, abandoned writing of Rabo (DX-W), it ignores completely Rabo's 1960 *published* article, which teaches that polyvalent cationic forms (rare earth is a polyvalent cation) of zeolite X have "virtually nil" activity (PX 593, p. 1). Rather than enriching the art, Rabo taught expressly away from the patented inventions.

DX-AAK is a deposition by written questions of an Esso engineer stating that some unidentified person at Esso "prior to January 1, 1962" proposed a composition containing zeolite and an inorganic oxide. The timing of this "idea" is suspect, since by late 1961 rumors were circulating around the industry that Mobil was testing a zeolite-containing catalyst (Tr. 3132). Here again, there is no evidence that Esso ever did anything with this idea until after it heard of Mobil's announcement in March, 1962, which caught it "by surprise" (PX 728, Tab 2). Finally, the Esso idea is simply too late, coming five (5) years after the invention of the 249 patent in January of 1957 (Op. 228).

DX-AAT is a laboratory notebook entry of Schwartz, a worker at Mobil's Paulsboro laboratory. More than two years after Rosinski disclosed to Schwartz Rosinski's idea for forming uniform pores in silica-alumina (PX 652) and more than a year after Plank and Rosinski's successful reduction to practice of the 249 invention Schwartz recorded an idea for combining zeolite with silica (DX-AAT). Schwartz's zeolite was a sodium zeolite and not an "ion-exchanged" zeolite (*cf.* Br. 28). Schwartz's sodium zeolite, like that of Fleck, would have been "destroyed" if it ever came near a commercial cracking unit (Op. 229). Not surprisingly, Schwartz's idea also lay abandoned until resurrected by defendant at trial.

In short, the belated, abandoned ideas of Carbide, Esso and Schwartz "remained secret, effectively concealed and suppressed, until exhumed * * * for the defense of this case." *Carter Products v. Colgate-Palmolive Co.*, 130 F.

Supp. 557, 569 (D. Md. 1955), *aff'd*, 230 F.2d 855 (4th Cir. 1956), *cert. denied*, 352 U.S. 843 (1956). As found by Judge Clarie:

"* * * Until 1962, when the Mobil patent '249 came on the market, the gas oil cracking catalyst art had made no significant improvement in petroleum catalytic cracking during 20 years of well-organized, active, and expensive research effort in this sensitive catalytic field of chemical magic and unpredictable results." (Op. 218)

III. THE PATENTS ARE INFRINGED

A. Introduction

In resolving the factual question of infringement in favor of Mobil and against Grace, Judge Clarie carefully analyzed and made detailed findings concerning the accused products, their method of manufacture and method of use, compared them with the specifications and claims of the patents in suit (Op. 251-54) and concluded: (i) "The accused catalysts are made in the same manner as is taught by the patents in suit" (Op. 252); (ii) "When the accused Grace catalysts are subjected to the same catalytic cracking tests as described in the patents in suit, they show the same performance advantages as do the patented compositions" (Op. 252); and (iii) "The accused catalysts fall clearly within the words of the asserted claims and therefore infringe" (Op. 257).

Judge Clarie also found: (i) that the testimony of Mobil's witnesses was "completely credible and persuasive" (Op. 252); (ii) that Grace "did not introduce any testimony that the Court considers to have contradicted any of the infringement proofs offered by plaintiff" (Op. 252); (iii) that Grace "had no reasonable non-infringement defense" (Op. 253); and (iv) that Grace's "own writings and extra-judicial assertions persuade the Court that defendant knew its product infringed plaintiff's patent rights" (Op. 253).

Nevertheless, Grace now asserts that the Trial Court's detailed findings of infringement are "clearly erroneous" because: (i) Grace independently developed its infringing catalysts (Br. 10); (ii) the patents in suit do not embrace Grace's fluid catalysts (Br. 9, 43-44); (iii) Grace's catalysts lack an inorganic oxide gel matrix (Br. 44); (iv) the patents in suit are limited to base exchanging in a particular order (Br. 45); (v) the patent claims cannot embrace both rare earth and rare earth hydrogen zeolites (Br. 45); and (vi) no calcining step is performed on Grace's catalyst (Br. 44-45).

Before dealing with these arguments, it is worth noting that where infringement is concerned Grace views the claimed inventions as "intricate and detailed" thereby rendering the infringement issue "intricate and detailed" (Br. 8-9). On the question of validity, however, Grace has no such difficulty. There everything is "straightforward", involving only "an exercise of common sense logic" (Br. 25). Grace's attempt to have it both ways reveals the artificial nature of its position on this appeal.

B. Judge Clarie Properly Rejected Grace's Independent Development Defense

Grace alleges that it independently developed its catalysts and proffers that allegation as a defense to its infringement (Br. 10). That contention is flatly contradicted by Grace's own extra-judicial admission that:

"* * * Davison * * * directed no efforts toward the use of sieves [zeolites] in catalysts until 1962, when the granting of South African patents to Socony [Mobil] for the use of molecular sieves in cracking catalysts activated Davison's efforts" (PX 537A, p. 4);

and Judge Clarie's findings that:

"Grace's efforts to copy Mobil were appreciably enhanced when the former's catalytic expert, Dr. Baker, procured a copy of Mobil's South African Patent (a counterpart of the '249 patent in the United States)

which fully disclosed much of the basic Mobil technology (PX-124; PX-132; Tr. 1820). * * * (Op. 222); and

* * *

"* * * Defendant, from the moment it learned of plaintiff's invention began a concerted and successful course to imitate, duplicate, and market the fruits of plaintiff's labors and expense * * *" (Op. 253).

Moreover, even had Grace independently developed its catalysts, it would be no defense in this action for patent infringement. *United States v. Berdan Firearms Mfg. Co.*, 156 U.S. 552, 566 (1895); *Walker on Patents*, Vol. 3, Section 453, p. 1684 (1937).

C. Judge Clarie Properly Held That Grace's Fluid Catalysts Infringe the Asserted Claims

Grace urges (Br. 9, 43-44) that its infringement is excused because the patented inventions are limited to moving bed catalysts. This contention was rejected by Judge Clarie. He found instead that each of the claims of the patents in suit read on and were infringed by Grace's fluid catalysts (Op. 251-54). Judge Clarie is correct.

The difference between moving bed and fluid catalysts resides in the size of the catalyst particles, i.e., moving bed catalyst particles are the size of peas, while fluid catalyst particles are smaller (Op. 216). The chemical composition of moving bed and fluid catalyst particles is the same, and the same chemical reactions occur in the cracking units independent of catalyst particle size (Op. 216). Indeed, fluid catalyst has been prepared simply by grinding up moving bed catalyst (Op. 216).

None of the *claims* of the patents in suit contains any limitation to fluid or moving bed catalyst particles. To the contrary, all of the claims in suit are generic to both catalyst particle sizes. Finally, each of the patents in suit expressly teaches the preparation and use of both the fluid and moving bed sized catalyst particles (249-7/2-22;

253-11/59-62; 357-6/36-40; Tr. 1464-67). See, for example, the 249 patent, wherein it is stated:

"* * * The use of the spheroidally shaped [catalyst] particles is of *particular* advantage in * * * the *fluidized* process * * *." [7/17-20]

D. Judge Clarie Properly Found That Grace's Catalysts Contain an Inorganic Oxide Gel Matrix

At Br. 44 Grace asserts, as it did below (Op. 214), that it does not infringe Claims 15 and 19 of 249, Claim 32 of 253 and Claim 15 of 357, because its products do not contain an inorganic oxide gel matrix. The record establishes and Judge Clarie found the contrary.

In the preparation of each of its catalysts Grace composites a crystalline zeolite with a major amount of silica-alumina gel (which is an inorganic oxide gel) and a minor amount of clay (DX-MO, MP, MQ, MR, MS, NA; PX 684; Tr. 638-42). Mr. Rosinski testified and Judge Clarie found that the silica-alumina gel is the matrix (Tr. 638-39; Op. 252).

Grace's own documents are equally enlightening. According to Grace, its catalysts comprise:

"* * * cation-exchanged molecular sieves dispersed in an inorganic system, such as a *silica-alumina*. We refer to this inorganic system as the 'matrix'" (PX 735, Tab 1, Document 110969).

It is small wonder Judge Clarie found that Grace's "own writings * * * persuade the Court that defendant knew its product infringed plaintiff's patent rights" (Op. 253).

By including clay in its catalysts, Grace is simply following the express teachings of the patents in suit (249-2/67; 253-10/31; 357-5/22; Tr. 332-33).

E. Judge Clarie Properly Ruled That the Asserted Claims Are Not Limited to a Particular Order of Base Exchange

Grace asserts that it does not infringe Claims 19, 23, 24 and 28 of 253 and Claim 19 of 357 arguing, without record citation, that those claims require that base exchange with rare earth and ammonium be effected in a particular sequence (Br. 45). The claims contain no such limitation. Moreover, as found by Judge Clarie:

"* * * The patents in suit make clear that base-exchange can be carried out at any time, i.e., before, after, or before and after incorporation of the zeolite into the matrix * * *." (Op. 252).*

* * *

"In manufacturing its accused catalysts, defendant followed the instructions and requirements of claims 23, 24 and 28 of the '253 patent. While defendant argues that these claims specify certain orders of treatment of the zeolite, the specification of the patent makes clear that any order of base-exchange can be employed with the same results. * * *" (Op. 253).

F. Judge Clarie Properly Held That Grace Infringed Both Claims 9 and 10 of the 357 Patent

Grace next attacks the Trial Court's factual findings that it infringes Claims 9 and 10 of 357, asserting that the "same catalyst cannot infringe both claims" (Br. 45). Once again, Grace is wrong.

Claims 9 and 10 stand in genus-species relation with respect to cation content, Claim 9 reciting that the catalyst contain rare earth and Claim 10 reciting that the catalyst contain both rare earth and hydrogen. As Professor Smith, an "eminent expert" (Op. 252), testified, each of Grace's catalysts containing Y zeolite, i.e., DZ-5, DZ-7, OZ-1 and CBZ-1, has rare earth as called for by Claim 9 and each has rare earth and hydrogen as called for by Claim 10

* See, e.g., 249-5/45-62; 253-9/29-41; 357-4/9-27.

(Tr. 1390-91). Judge Clarie found Professor Smith's testimony "completely credible and persuasive" and found that both Claim 9 and Claim 10 were infringed (Op. 252).

G. Judge Clarie Properly Found That Grace's Catalysts Were Calcined

Finally, Grace attacks the factual findings of Judge Clarie that it infringes Claim 1 of 249 and Claim 20 of 357, asserting that its catalysts are not calcined (Br. 44-45). Grace is wrong.

The evidence is (Tr. 1770-76, 2383-84, 2405-09) and Judge Clarie found that Grace sold its catalyst to its refiner customers knowing that it would be calcined when added to their cracking units and, therefore, that Grace was guilty of contributory infringement.

"Defendant knew at the time it sold each of its accused catalysts that its customers would place the catalysts as sold by defendant into their catalytic cracking units and that in the course of passage through the catalytic cracking units, the catalysts purchased from Grace would be subjected to the heating and calcining conditions specified in claim 1 of '249 and claim 20 of '357, and that consequently all of the effects of such heating or calcining would be achieved by defendant's customers. Consequently, defendant was able to achieve all of the benefits described by the patents for heating or calcining, while at the same time foregoing the necessity of itself having to undergo the expense of carrying it out. In this respect, defendant, in effect, made each of its customers its agent in completing the infringement step, knowing full well that the infringement step would in fact be promptly and fully completed by those customers. Grace is an infringer of '249 claim 1 and '357 claim 20 * * *" (Op. 253).

In so ruling, the Trial Court was on sound legal ground.

"* * * at the time appellant delivers its gears to the purchaser the final step in each of the process claims

has not been taken. It does this with the knowledge that the railroads will put them to use and thereby flatten the crown, thus completing the final step of the process.

In this the District Court found appellant guilty of contributory infringement of each of the process claims, and we think that finding is correct." *Peerless Equipment Co. v. W. H. Miner, Inc.*, 93 F.2d 98, 105 (7th Cir. 1937), cert. denied, 303 U.S. 641 (1938).

In addition, Grace takes an aliquot portion of each catalyst shipment and calcines it at a temperature in excess of 1000° F. for 12 to 24 hours after which the sample is tested for its catalytic efficacy (Tr. 2397-2401, 2363). This commercial quality control testing constitutes a direct infringement by Grace of claim 1 of 249 and claim 20 of 357. The "testing was a *commercial use* * * * and hence an infringing use." *Radio Corporation of America v. Andrea*, 90 F.2d 612, 614 (2nd Cir. 1937).

"Use of a patented composition for commercial purposes, such as quality control testing, is a direct infringement of the patent." *Rayonier Inc. v. Georgia Pacific Corp.*, 156 U.S.P.Q. 110, 126 (W. D. Wash. 1967).

IV. THE PATENTS ARE ENFORCEABLE

Before the district court, Grace asserted five claims of patent misuse. Four have now been abandoned, leaving only the contention that Mobil refused to grant defendant a license under the '249 patent alone, but rather insisted that it take a license under a "package" of Mobil patents.* The trial judge, having listened to the evidence and having evaluated the testimony, rejected this claim, holding that

* In the lower court Grace also attacked Mobil's alleged lack of candor during prosecution of the applications for the patents in suit in the United States Patent Office; the "tying" of use claims licenses to method-of-making claims licenses; the "tying" of the sale of certain catalyst components to its grant of a license to one of its foreign licensees, Kalie-Chemie Aktiengesellschaft; and unlawful pre-issuance and post-expiration royalties.

Mobil did not "coerce" any licensee or engage in any unlawful "conditioning" (Op. 249, 257). The court aptly summarized the situation as follows:

*"Thus, it is apparent that 'Mobil has been and remains willing to license any one or more of the patents that anyone is interested in' (Tr. 3049). There is no evidence to substantiate the allegation that Mobil in any way attempted to coerce Grace to take a license under more of Mobil's patents than Grace desired, or that Mobil 'conditioned' any grant upon acceptance of a license under unwanted patents."** (Op. 249)

Defendant's efforts to reargue the evidence in a manner that was found so totally unconvincing by the court below "** * ** is wholly misplaced before an appellate court."

United States v. Bottone, 365 F.2d 389, 392 (2d Cir.), cert. denied, 385 U.S. 974 (1966). The decision rejecting defendant's misuse defense is overwhelmingly supported by the record, and accordingly, should be affirmed.

A. The Necessity of Proving Coercion

In essence, Grace's strategy here, as below, is to complain generally about Mobil's "defined field"** type licenses and to imply that Grace would have preferred some

* The only witness offered by Grace with respect to its misuse defense was Robert G. Goodall, who left the Davison division of Grace in July 1966 (Tr. 2722, 2724) and who attended only one or two of the many license negotiation meetings that are the heart of Grace's claim (Tr. 2293, 2861, 2887-88). Yet, the Grace personnel that participated in the negotiations were readily available (Tr. 2757-58, 2844-46, 2986). Mobil offered the testimony of its General Patent Counsel, Andrew L. Gaboriault, who attended virtually all of the license negotiation meetings and prepared the various drafts and proposals submitted by Mobil to Grace (Tr. 2985).

** A "defined field" license involves setting forth a technological field in which the prospective licensee wishes to operate; the licensee is then granted immunity from liability under any patent of the licensor for the licensee's operations in that field (Op. 249n; Tr. 3009). The licensee thereupon has complete freedom to change the catalyst and select particular formulations in the broad field of zeolite composite catalysts, without having to disclose specific formulas to the patentee (Tr. 3082). Such licenses are quite common and are usually desired, as was the case here, by licensees.

different form of license (Br. 38-43). Since there is nothing inherently illegal in a defined field license absent "coercion" or unlawful "conditioning," the key question is whether Grace did desire a different type of license which Mobil would not grant except "on condition" (Op. 257); *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100, 134-40 (1969); *Automatic Radio Manufacturing Co. v. Hazeltine Research, Inc.*, 339 U.S. 827, 831 (1950); *McCullough Tool Co. v. Well Surveys, Inc.*, 343 F.2d 381, 408-09 (10th Cir. 1965), cert. denied, 383 U.S. 933 (1966). This, of course, is a fact question, which the district court properly resolved against Grace (Op. 249, 257).

In order to have sustained its claim, it was Grace's burden to show that it seriously desired a license under a specific patent or patents, which Mobil refused to grant. *Plastic Contact Lens Co. v. Frontier of the Northeast, Inc.*, 441 F.2d 67, 73n.10 (2d Cir.), cert. denied, 404 U.S. 881 (1971); *Glen Mfg. Inc. v. Perfect Fit Industries, Inc.*, 420 F.2d 319, 321 (2d Cir.), cert. denied, 397 U.S. 1042 (1970); *McCullough Tool Co. v. Well Surveys, Inc.*, *supra*; *Plastic Contact Lens Co. v. W.R.S. Contact Lens Laboratories, Inc.*, 1970 Trade Cas. ¶73,274 (S.D.N.Y. 1970). Grace utterly failed to make any such showing (Op. 249, 257). Here, as in *Plastic Contact Lens Co. v. Frontier of the Northeast, Inc.*, *supra*, "[n]othing in the present record shows that [Mobil] insisted on the agreement in the face of [Grace's] protestations, if any were made, or that [Mobil] rejected alternative proposals by [Grace], if any were offered." 441 F.2d at 73n.10.

B. A Review of the Mobil-Grace Negotiations Refutes Any Possible Claim of Coercion

The evidence is overwhelming, as Judge Clarie found, that Mobil neither "coerced" Grace to take a license under any group of patents, nor "conditioned" the grant of a license upon Grace's acceptance of unwanted patents (Op. 249, 257). To the contrary, Mobil made every conceivable effort to reach a license agreement on any basis Grace desired (Op. 249). As Mr. Edmunds, Grace's chief negoti-

ator, admitted, "I don't recall Mobil refusing to discuss a license on something we thought we needed to accomplish [Grace's] business ends" (DX-BAS, Tr. 370-71; Op. 247).

However, while Mobil was trying to accommodate Grace, Grace was following another course. The Grace strategy of stalling and posing "requests" for the sole purpose of delaying the negotiations was detailed in a memorandum dated August 31, 1967 (PX-319), from Mr. Edmunds to his superior, Grace's Executive Vice President, Mr. Tracy (Op. 247; Tr. 3039). The memorandum refers to an internal Grace meeting held on October 28, 1966 and confirms to Mr. Tracy that:

"It was agreed that we would attempt to continue to 'bounce the ball', to use your term, with Socony. It was agreed that we could not take a license on the terms offered and it was to our advantage to try to delay taking any license until the question of ownership of the inventions was clarified."

Thus, while Mobil proceeded in good faith to offer to license Grace on any basis it desired, "single patent" or otherwise, defendant raised an endless and everchanging list of excuses for refusing to sign a license.* Not surprisingly, no agreement was reached. The success of Grace's strategy of "bouncing the ball" with Mobil is best illustrated by a brief chronological review of the four years of "negotiations."

At a meeting held in July 1964, shortly after the issuance of the 249 and 253 patents in suit, Grace's counsel raised the possibility that it might be interested in a license under certain claims of the 249 patent (PX-728, Tab 17; Tr. 2757). Mobil advised Grace's lawyer that if the company wanted to be licensed under only a single patent, Mobil would oblige:

* Not only did Grace refuse to sign a license agreement, but all witnesses for both parties testified that Grace, which is attempting to assert that Mobil did not offer it the right type of license, never even submitted a draft of any license which it deemed satisfactory or any written proposal (Tr. 2851, 3042; DX-BAS, Tr. 139).

"I think the main thing our people had pointed out *** [was] that we were prepared to grant a license and that we were interested in granting a license to [Grace], and hopefully we didn't want to go through negotiations on every separate patent that came out, but if this [a license under the 249 patent only] was all they wanted we'd be prepared to grant them such a license" (PX-333, Tr. 120-21; Op. 247).

The Grace business representatives at the meeting, however, expressed a different desire. They wanted a license which would free them from suit under any Mobil patent.* To meet this request, Mobil shortly thereafter submitted a proposal (DX-QH) for a license in a defined field of technology (Op. 247; Tr. 2987-88).

When the parties next met in October 1964, Grace's patent counsel, Mr. Wilson, decided that he would like Mobil to prepare a new draft, this time for a license under the 249 patent, with the option to Grace to add additional patents at anytime, without an increase in royalty (Op. 247; Tr. 2989, 3101). Mobil responded on October 26, 1964, submitting a draft outline of such a license, which suggested a royalty of \$200 per ton (DX-QP).**

* The desire of the Grace business representatives was understandable. At any given point in time a catalyst maker would likely be infringing three to five of Mobil's patents, and thus, a grant under the '249 patent alone would not have freed Grace from all liability to Mobil (Tr. 3081). This made no sense to the Grace businessmen. Mr. Edmunds stated this position succinctly when he noted that what he wanted was to "get clear of all these patents" (DX-BAS, Tr. 238).

** Grace misleadingly takes Mr. Gaboriault's statement that this was the "identical royalty" as offered earlier by Mobil, out of context (Br. 40). Mr. Gaboriault had been explaining, and Judge Clarie found, that this was the same royalty Mobil had previously proposed because Grace had asked for the right to broaden its license at will to include any and all Mobil patents, *without any increase in royalty*, thus obtaining a license of the same scope as the defined field license Mobil had offered earlier (Op. 247; Tr. 2987-90). Mobil had expressed a willingness to grant a license for the 249 patent alone at a lower rate, with an increase in rate as additional patents were added, but had submitted this draft form of license (DX-QP) upon Grace's request (Op. 247; Tr. 2989-3101).

On March 25, 1965, the parties met to discuss the October draft (Tr. 2993-94; DX-RG). At that meeting it became apparent that the business people had prevailed in their demands within Grace as to the type of license that was needed. The Grace negotiators were not interested in a license under only one patent, but rather a license which would give them complete freedom to make any catalyst they desired, free from any claim by Mobil (Tr. 2994, 3103; DX-RF). Consequently, subsequent talks centered around defined field licenses.

Nonetheless, in April 1965, when the negotiations had become stalled, Mr. Dickerson, then General Patent counsel of Mobil, anxious to move the matter along, suggested to Mr. Wilson, his counterpart at Grace, "the possibility of reverting back to our original approach, wherein [Grace] would be granted an immunity under the specific patent or patents which they consider pertinent to the specific catalyst or catalysts presently being produced by Davison" (PX-297). To that end, on or about May 4, 1965, Mobil prepared a draft of a license under the 249 patent alone for transmission to Grace (Op. 247; PX-284; Tr. 2999-3001).* But, before that draft was even sent, "the Grace business people informed [Mobil] that they were not interested in this kind of arrangement since it didn't solve all of their problems with other Mobil patents" (Tr. 3001; Op. 248; DX-BAS, Tr. 238, 247).** Thus, Mobil reverted to the form of license the Grace negotiators had indicated they would accept.

In December 1965, after a series of discussions which focused primarily upon the size of the royalty, Grace agreed to a defined field license at a 12% royalty rate (Tr. 2004-05; DX-TC). Mr. Edmunds informed Mr. Goodall of the agreement in a memorandum which stated, "I tele-

* It is noteworthy that the royalty payment provisions of this draft were left blank in recognition of the fact that a license under the 249 patent alone would require a different royalty than a defined field license (PX-284, ¶¶3.1-3.2).

** Judge Clarie's finding to this effect (Op. 247) is based upon *uncontroverted testimony*, which is a far cry from Grace's characterization of the finding as being "unsupported speculation." (Br. 40).

phoned Danner [of Mobil] and advised him that we would be willing to sign under the above conditions * * * [for] 12% * * *" (DX-TC, p. 2) and went on to pronounce "the deal has now been made" (DX-TC, p. 3; Op. 248; Tr. 2872-75). Accordingly, Mobil prepared and sent Grace a license agreement containing the agreed-upon terms, for execution (Tr. 3010-11, 3019; DX-TH).

No sooner had Mobil sent the agreement, than Grace again began to shift gears. This time defendant procrastinated until June 1966 before advising Mobil that it would not execute the license because of "developments" which allegedly made Grace doubt whether 12% was a fair royalty (Op. 248; Tr. 2810-11). Grace did not assert or claim that it wanted a license under less than all of the patents being offered or that the type of license negotiated was in any way unsatisfactory (Op. 248; Tr. 2874, 3008); to the contrary, Grace informed Mobil that it had a new idea, which also envisioned a defined field license (Op. 248-49; Tr. 3019).

Grace's new ploy was a suggestion that it would pay Mobil for past infringement (at the previously agreed-upon 12% rate) and acquire an "option" to take a defined field license six months thereafter (Op. 248-49; DX-UH; Tr. 2878-79, 3019). Since Grace made it clear that this was the only basis upon which it would be willing to deal, Mobil reluctantly agreed (Tr. 2878-79, 3019-20). However, once Mobil agreed, Grace again reneged and refused to execute such an agreement (Op. 249; Tr. 3028-29). Upon Mobil's request, Grace set forth in writing on December 9, 1966 (PX-574) its reasons for this latest refusal. Significantly, this letter makes no mention, or even hint, of any alleged desire for a different kind of license (PX-574; Op. 249; Tr. 3029-30).

Although Mobil seriously questioned whether Grace was acting in good faith, on December 14, 1966 another meeting was held (Tr. 3030-31). The bulk of this meeting consisted of a reiteration by Grace of the points set forth in its December 9th letter, PX-574 (Tr. 3032). Sensing that Mobil would not continue to talk about those points for very long

and having been given a specific mandate to stall (PX-319), Mr. Wilson inquired about the possibility of a license under less than all the patents (Op. 249; Tr. 3032-33; PX-302). As it had done previously, Mobil once more expressed a willingness to grant such a license, if this was in fact what Grace wanted (Op. 249).* With their bluff called, the Grace negotiators had to concede that they really weren't interested (Op. 249; PX-302).

Despite its suspicions, in early 1967 Mobil decided to make a new "high level" approach to Grace in an attempt to negotiate an agreement (Tr. 3036-40). This approach was made to Mr. Tracy, who, the record now reveals, was the very man who had issued the instructions to the Grace negotiators to "bounce the ball" with Mobil (Op. 249; Tr. 3039-40; PX-319). Understandably, the "high level" approach also failed, and Mobil was compelled to institute this suit (Op. 249; Tr. 3040-46).

Mobil made a final effort to license Grace in 1968, making several specific offers for a license under identified patents (Op. 249; Tr. 3046; PX-322). These offers, made in good faith by Mobil, have become a predicate for Grace's latest effort to claim misuse (Br. 39). Defendant's tactic of picking at these offers, claiming that certain of them were in one way or another illegal, is both unseemly and unavailing. The offers themselves plainly stated that "[t]he alternatives set out * * * are * * * by no means exclusive of plans Mobil is willing to negotiate" (PX-322, p. 2). Indeed, PX-322 unequivocally stated, and the district court found, that "Mobil is willing to negotiate for release and license of any one or more of its patents which Grace may designate" (PX-322, p. 3; Op. 249; Tr. 3049).** Mobil was clearly not setting out any ultimata; it was trying to suggest bases for discussions, assuming that Grace were seriously

* "I responded to [Mr. Wilson's inquiry] that Mobil was prepared to license any one or more of all of its patents on a specified royalty" (Gaboriault Tr. 3033). Mr. Gaboriault's contemporaneous memorandum of this meeting (PX-302) confirms his testimony.

** Grace terms this finding of the lower court, which is based wholly upon uncontroverted, contemporaneous documentary evidence, "incomprehensible." (Br. 39). In reality, it is Grace's summary rejection of all of these offers that is "incomprehensible."

interested in a license. Grace, however, never even made a counter-proposal; it responded with a blunt refusal, stating that it was not interested (PX-578).

To summarize, it is difficult to imagine a clearer picture of good faith efforts by a patentee to license upon any reasonable basis desired. The evidence is overwhelming. Mobil never tried to foist an unwanted package of patents upon Grace. Throughout the long period of negotiations Mobil acted in good faith, making every attempt to reach an agreement; Mobil never refused to grant any type of license or to discuss any proposal Grace suggested (Op. 249). Grace, on the other hand, deliberately delayed, using every conceivable excuse to avoid either taking a license or being sued (Op. 246-47). As part of its stratagem, Grace periodically held out the possibility that it would consider some different form of license, but when Mobil squarely met each such suggestion, the Grace "negotiators" confessed they weren't interested (Tr. 3001, 3033-34; PX-302; PX-319; PX-578).

While Grace was free to test the patents by infringing (as it did), it cannot, we submit, transform its tactic of stalling and delaying during four years of negotiations into a misuse defense. For defendant to assert, in the face of the record in this case, that Mobil "conditioned" the grant of a license or in any way "coerced" Grace, is, as Judge Clarie found, simply not credible (Op. 249, 256).

V. THE TRIAL COURT PROPERLY ENJOINED GRACE'S CONTINUED INFRINGEMENT

At Br. 46-48 Grace argues that while Judge Clarie may have been correct in holding the patents in suit valid, enforceable and infringed, he nevertheless abused his equitable discretion when he enjoined Grace's further infringement. Thus, Grace asserts that the injunction was improvidently granted because: (i) Mobil and Grace "are not competing manufacturers" and (ii) Grace is the world's major producer of cracking catalyst (Br. 47). As Grace

admits (Br. 47), these factors were fully considered by Judge Clarie and found unpersuasive.

Grace directly competes with Mobil's fluid catalyst manufacturing licensees Houdry, Nalco and American Cyanamid (Op. 224) and Mobil directly competes with Grace's refiner customers such as Texaco in the use of the fluid form of the patented catalysts to produce gasoline. Moreover, Mobil manufactures, sells and uses the moving bed form of the patented catalysts (Op. 224). Such record facts render wholly inapposite *Foster v. American Machine & Foundry Co.*, 492 F.2d 1317 (2d Cir. 1974), where the patentee completely failed to commercialize his invention.

Grace's assertion (Br. 47) that the injunction serves "no legitimate interest of Mobil" is wrong. The injunction protects Mobil's licensees from the unlicensed and therefore unlawful competition of Grace. It also ensures continued payment of royalties to Mobil by its licensees. In short, it is necessary to preserve the value of Mobil's patents.

"* * * [I]t is claimed that, this suit having been brought by complainants, and it appearing that they themselves had not used the monopoly of their patent, they were not entitled to an injunction. I do not think that point is well taken. The action is necessarily for the benefit of their licensees, and it is their duty to protect their licensees by suits against parties who were infringing the same; otherwise, the value of the patent would be absolutely destroyed." *Norton v. Eagle Automatic Can Co.*, 57 Fed. 929, 934 (C.C. N.D. Calif. 1893).

Grace's argument, i.e., that the injunction is detrimental to the public interest (Br. 47), is erroneous. While there may be a shortage of crude oil, there is no shortage of catalyst. Since Grace cannot equate its own interest with the public interest, its reliance on *City of Milwaukee v. Activated Sludge*, 69 F.2d 577 (7th Cir. 1934), is misplaced.

In arguing (Br. 47) that the injunction is improper because Mobil had previously offered Grace a license, Grace neglects to mention that: (i) it repeatedly rejected

the proffered license; and (ii) it refused to terminate its infringing activities. These were the very acts which necessitated the filing of this suit in 1967. That Mobil kept its offer of a license open even during the trial enhances the equities of Mobil, not Grace.

Grace now seeks equitable relief from the injunction ordered by Judge Clarie. To be entitled to such relief, however, Grace must come before this Court with clean hands. *Frad v. Columbian National Life Ins. Co.*, 191 F.2d 22, 26 (2nd Cir. 1951), cert. denied, 342 U.S. 904 (1952). The Trial Court found that Grace's hands were not clean, i.e., it found: (i) Grace copied the inventions of the patents in suit (Op. 256); (ii) during licensing negotiations between the parties "Grace was not negotiating in good faith" (Op. 246); (iii) Grace knew it infringed and had no reasonable non-infringement defense (Op. 253); and (v) from the moment Grace learned of Mobil's invention Grace "began a concerted and successful effort to imitate, duplicate and market the fruits of plaintiff's labors and expense" (Op. 253).

Aposite here is *White v. Fafnir Bearing Co.*, 263 F. Supp. 788, 812 (D. Conn. 1966), *aff'd*, 389 F.2d 750 (2nd Cir. 1968).

"* * * By reason of its own direct appropriation and imitation of the plaintiffs' invention, the defendant Fafnir has no standing to invoke the equitable power of this Court to escape the consequences of its own wilful acts. * * *."



Service of 2 copies of the
within Brief is hereby
admitted this 6/10/74 day of

Oct. 1974

Signed William C. Keen

Attorney for Defendant-Appellant

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